

MONTHLY WEATHER REVIEW,

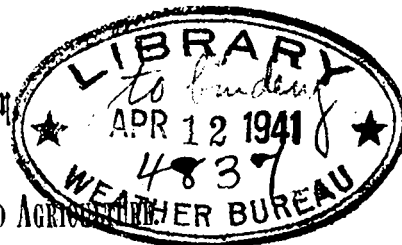
JANUARY, 1878.

WAR DEPARTMENT,

Office of the Chief Signal Officer

DIVISION OF

TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE



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INTRODUCTION.

In compiling the present REVIEW the following data, received up to February 14th, have been made use of, viz: the regular tri-daily weather charts, containing the data of the simultaneous observations taken at one hundred and twenty-eight Signal Service stations and twelve Canadian stations; monthly journals and means from one hundred and thirty-four of the former, and means from thirteen of the latter; two hundred and forty monthly reports from Volunteer Observers; thirty-five monthly reports from United States Army Post Surgeons; Marine Records; International Simultaneous reports; monthly reports of the Weather Services of Canada and of the States of Iowa and Missouri; reliable newspaper extracts; special reports. The most prominent events of the month have been: the high temperatures of the Missouri and Upper Mississippi valleys and the Lake region; the high pressures over the same region; the severe storms of the 11th and the 31st on the Atlantic coasts, and of the 14th to the 16th and the 24th to the 28th on the Pacific coasts; the excessive rain-fall in northern California; the remarkable measured wind-velocities of 120 miles per hour at Cape Lookout and 186 at Mt. Washington; the forward state of vegetation in the western and northern sections; the aurora of the 23rd.

BAROMETRIC PRESSURE.

In General.—The general distribution of atmospheric pressure is shown by the isobars on chart No. II. A comparison with former years shows that pressures have been normal over Lakes and upper Canada, but above the mean on the Pacific and Atlantic coasts, and 10 or 15 hundredths of an inch above the mean in the Gulf States.

Barometric Ranges.—The largest and smallest monthly ranges have been as follows: California—Red Bluff, 0.98; Los Angeles, 0.42. Rocky Mountains—Denver, 0.56; Pike's Peak, 0.49. Northwest—Yankton, 1.07; Deadwood, 0.64. The Southwest—Jacksboro', 1.08; Uvalde, 0.60. Upper Mississippi valley—St. Paul, 1.03; Davenport, 0.95. Upper Lakes—Chicago, 0.97; Escanaba, 0.80. Lower Lakes—Oswego, 1.17; Detroit, 0.89. Ohio valley—Cincinnati, 1.22; Pittsburgh, 1.11. East Gulf States, Vicksburg, 1.05; Key West, 0.55. South Atlantic States—Cape Lookout, 1.36; Jacksonville, 0.87. Middle States—Albany, 1.54; Baltimore, 1.23. New England—Portland, 1.85; New Haven, 1.54, and Mount Washington, 1.13.

Departures from Normal Pressures.—The following synopsis of the tri-daily map of departures from normal values of the pressures observed but not reduced to sea-level, (inasmuch as the normal annual and diurnal periodicities, and the normal geographical distribution, of the pressure are thereby eliminated,) will in connection with the subsequent history of areas of low and high pressure, as defined by the isobars for sea-level, give a complete view of the pressure during the month. The month began with a depression of —50 hundredths of an inch over Nova Scotia, and an excess +30 over Manitoba and Oregon; the line of no departure extended from Minnesota to Louisiana. On the 2nd the pressure rapidly fell in the Northwest, and a depression developed along the east slope of the Rocky Mountains, being greatest, —59, at Dakota at 11 p. m., while +23 was reported from Oregon and +19 from the Lower Lakes. The 3rd began with a depression of —40 in Dakota and Texas, and an excess, +30, in the St. Lawrence valley and +13 in California. The depressions extended eastward, and, at 11 p. m.,

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were, respectively, in the upper Mississippi valley and in Tennessee; pressure rapidly rose to +24 in Oregon and +44 in Maine. The 4th began with -50 on the North Carolina coast, +46 at Eastport, +10 in Texas, +25 in Manitoba, and +30 in Oregon. The depression moved northeastward, followed by rapid rise in the Mississippi valley and the Southwest. A second depression, however, developed in Manitoba and Montana. The 5th began with +35 in the lower Mississippi valley and +26 in Manitoba, but -18 in Wisconsin and -70 at Eastport. The depression moved eastward, and, by 11 p. m., an area of about +30 extended from Manitoba to the Gulf of Mexico, while a slow fall resulted in a depression of -10 on the Pacific coast. The 6th began with -10 or -12 on the Pacific coast, +35 in the Northwest and Mississippi valley, and -5 over the Lower Lake region. During the day the barometer fell slowly west of the Rocky Mountains, but steadily rose from Manitoba southward, so that, at 11 p. m., -16 prevailed on the Pacific coast, and +40 in the upper Mississippi valley. The 7th began with an area of excess over the entire country east of the Rocky Mountains; the highest, +48, in the Ohio valley. A slight depression prevailed in Colorado, and a decided one, -25 to -30 in Manitoba and Oregon. The depression rapidly developed during the day, and, at 11 p. m., there were reported -46 in Oregon, -30 in Manitoba, 0 from Nevada to Indian Territory, and thence to Lake Superior, and +50 on the Middle Atlantic coast. During the 8th the 0-line remained in the Mississippi valley, but the pressure increased to +67 at Eastport, and diminished to +20 in the South Atlantic States. The low pressure on the Pacific coast was followed by a steady rise up to +4 in Oregon at 11 p. m., at which time a 0-line trended southeast from Vancouver's Island to northern Texas, and the greatest depression, -60, was in Manitoba and northern Dakota. The 9th began with rapidly falling barometer in the Pacific States, and a depression of -10 in Oregon, but an excess over California and the Rocky Mountain region; a depression from Colorado to the Mississippi, which amounted to -40 throughout Minnesota, and to -20 throughout the eastern part of the Gulf of Mexico, and an excess over the Middle States and New England, amounting to +45 on the coast of Maine. During the day the depression decidedly increased, and the excess in the Middle States and New England diminished. The 10th began with the depression -85 at Cape Hatteras, which had moved thither from the eastern portion of the Gulf of Mexico, a general depression of -35 prevailed from Ohio to Illinois, and the depression in Oregon had extended southward over California, and eastward over Dakota. The former passed slowly northeastward to -100 at Cape Cod, and the latter during the day became central as -60 in Dakota, while the pressure rose on the Pacific coast and over the Gulf of Mexico and Southern States. The 11th began with -119 at Portland, Me., -40 in Manitoba, 0 in Oregon, where pressure was highest, whence it appears that the pressure was below the normal over the entire country. During the day the barometer fell in Texas, but elsewhere rose, and at 11 p. m. was at or above normal west of Utah and Manitoba, as also over portions of Tennessee, Ohio and Lake Superior. The greatest depressions were -78 at Eastport, and -45 over western Texas. The 12th began with depressions of -32 at Boston, -55 in eastern Texas, but elevations of +12 Lake St. Clair, and +16 Salt Lake City. Pressure was then falling in the Southwest, but elsewhere rising. During the day pressure fell east of the Mississippi, and less so in Oregon; it rose at most Rocky Mountain stations, and in Manitoba, as also over New England. At 11 p. m. the depression -55 prevailed over Arkansas, the excess +20 over Wyoming Territory, Manitoba, &c. The 13th began with -52 at Cairo, -15 on the Pacific coast, +30 in Manitoba, +10 Middle Atlantic coast. Pressure was falling at Rocky Mountain Stations. During the day pressure rose, but fell again from the Mississippi westward, and at 11 p. m. a depression of -45 prevailed on the California and Oregon coasts, a slight excess prevailed from Manitoba to Colorado and southern Texas, as also in New England, the principal depression -47 was central along the Ohio valley. The 14th began with -58 at Philadelphia, and -44 at Portland, Oregon; from Dakota to Texas pressure was slightly above the normal, as also in Nova Scotia and New Brunswick, but elsewhere extensive depressions existed. Pressure was rising in Nevada and California, the Gulf States and Ohio valley, but during the day continued falling to -50 and -52 in California and Oregon, and probably to a less extent in Montana and British Possessions; it rose to +15 in Texas and also east of the Mississippi, but again fell in Maine to -73. The 15th began with -50 at San Francisco, -64 at Eastport, and +10 at Indianola. During the day pressure rose at San Francisco but fell in Oregon and westward to Manitoba. On the 16th and 17th telegraphic reports from the Pacific coast were not received, but the pressure appears to have continued very low north of San Francisco, and the depression in British America extended southward into Minnesota and Dakota, where the departure was -25 at 11 p. m. of the 16th, while +20 prevailed over northern New York. During the 17th pressure rose on the Pacific coast, but fell from the Rocky to the Alleghany Mountains, and rose to +27 in Nova Scotia. The 18th began with depressions -30 in Texas and -23 in Dakota, but elevations of +14 at San Francisco and +29 at Eastport. Pressure varied during the day east of the Mississippi, but rose to the westward, and at 11 p. m. elevations of +20 or more prevailed in Oregon and New England, but a depression of -30 existed in Texas, the depression in the Northwest appeared to die out. During the 19th the depression in the Gulf States moved slowly northeastward, and at 11 p. m. was central (-35) at Cairo, while the elevations were +17 in Oregon and +9 at New London. The 20th began with an elevation of +26 at Virginia City, but pressure had fallen rapidly on the Pacific coast, and also very generally in the Mississippi valley and

Atlantic States. The greatest depression was —39 at Knoxville. During the day the area of rising barometer extended eastward to the Alleghany, and the depression —30 extended from Georgia to Ohio. The 21st began with depressions —30 to —35 over the South Atlantic States, Ohio and portion of the Lower Lakes, but elevation +25 over the Rocky Mountain region and the Gulf of St. Lawrence. During the day pressure fell on the Pacific coast, and was stationary at Rocky Mountains, but fell in Middle and Eastern States to —45 in the St. Lawrence valley. The 22nd began with a rapid rise to +45 in Manitoba, but fell to —29 in Oregon and to —55 in the St. Lawrence valley and Nova Scotia. The fall on the Pacific coast was followed by a rapid rise. The rise in Manitoba extended southeastward to Lake Huron. The depression in the St. Lawrence valley was —53 at 11 p. m. The 23rd began with a continued rise on the Pacific coast, but fell in the Northwest and Southwest. The depressions were —31 Bismarck, —57 Boston, —61 Quebec. The elevations were +33 Escanaba, +8 San Diego. During the day the depressions rapidly developed, and the 11 p. m. map showed +24 San Diego, —45 Bismarck, —75 Gulf of St. Lawrence, +30 to +35 Virginia to Upper Canada. The 24th began with a rapid fall on the Pacific coast to —21 at San Francisco, and a rise from Colorado northward. The depressions were —35 from Minnesota to Missouri, and —54 at Sydney, C. B. The elevations were +35 to +40 over the Middle Atlantic States. During the day the pressure fell to —44 at Portland, Or., but elsewhere rose to +9 at Santa Fe, —24 in Upper Mississippi valley, and +25 at Halifax. During the night the depression in Oregon extended eastward to Utah, where, on the morning of the 25th, —30 was reported, while in Oregon +22, and in the Upper Mississippi —19, but at Sydney +27 prevailed. During the day the pressure rose on the Pacific coast and over New England and the Gulf of St. Lawrence, but fell from the Rocky mountains eastward to the Middle and South Atlantic coasts, so that at 11 p. m. there were reported in Indian Territory —31, and at Port Huron —26. The 26th began with —48 in Indian Territory and northern Texas, but +47 at Sydney, and +10 at San Francisco and Virginia City. By midnight the depressions were —43 Cairo and Memphis, and —37 Eastport, while the pressure had also fallen in Oregon and Montana to —22 and —24, but had risen to +1 Pembina, and +13 Salt Lake City. The 27th began with —53 at Cairo and —41 Sydney, (no reports from Oregon,) +26 Pembina. The depression moved rapidly eastward, and at 11 p. m. was —57 at Washington, but had risen to —10 over the Canadian Provinces, and fallen to —18 at Virginia City, but risen to +19 at Duluth. The 28th began with a depression of —74 at New London and an excess of +24 at Pembina. The depression moved northeastward and a second one formed in the Rocky mountains and the Lower Mississippi valley, so that at 11 p. m. there were reported —90 Sydney, +18 Escanaba, —48 Texas, +7 San Diego. The 29th began with a decided fall to —61 in Indian Territory and to 0 at San Francisco, but a rise over the Lake, Middle and Eastern States. By 11 p. m. these had become —66 at Shreveport, —22 San Francisco, and —56 Portland, Or., +43 Collingwood and +13 Cheyenne. The 30th began with —66 at Vicksburg, and pressure still very low in Oregon where, however, it rose during the day, so that at 11 p. m. the departures were —42 Portland, Or., —67 Savannah, +54 Quebec. The 31st began with another fall on the Pacific coast, and the departures were —8 Kittyhawk, +55 Chatham. The pressure however again rose from the Pacific to the Lake region, and at 11 p. m. the departures were +2 to +8 on the Pacific coast, —49 in Texas, —72 Cape May, +42 Chatham.

Areas of High Barometer in General.—These have been but few and unimportant, furnishing a great contrast to the conditions for January of former years. The consequent absence of cold northerly gales has given the country generally a month of remarkably mild weather, especially from the Missouri valley northward.

No. I.—This area covered Texas during the 1st.

No. II.—Advanced southward on the 2d, and eastward over the Lower Lake region. On the 3d it covered the Middle States and New England, and then retreated northeastward, being over the Gulf of St. Lawrence on the 4th.

No. III.—Extended for a short time along the east slope of the Rocky Mountains on the 3d; extended eastward on the 5th over the Gulf States, and was at night time reinforced by high barometer No. IV.

Nos. IV. and V.—Advanced southward on the 5th over Manitoba, and at 11 p. m. of the 6th was central over Missouri and Iowa; then it moved eastward, and at 11 p. m., the 7th, was central over Maryland, at which time pressure was increasing to the northward, so that during the 8th the barometer rose over New England and Nova Scotia, where it was highest at 11 p. m., after which the area of highest barometer moved eastward, and at 11 p. m. of the 9th was south of Newfoundland.

No. VI.—The barometer rose from California to Texas on the 8th and 9th; on the 10th the highest pressure was over the Gulf of Mexico, and on the 11th it advanced northeastward until at 11 p. m., when it was central in eastern Kentucky and northern Georgia; on the 12th, at 11 p. m., it had advanced to Eastern Virginia and Pennsylvania, and on the 13th, at 11 p. m., was central in Maine.

No. VII.—The pressure rose on the 12th in Manitoba, and on the 13th in the Southwest, forming a high area, which, at 11 p. m. of the 14th, was central in Texas, and at 11 p. m. of the 15th in Tennessee,

with equal pressure in the Lake region. The combined areas were central at 11 p. m. of the 16th and during the whole of the 17th, from the Middle Atlantic States to Canada. On the 18th the pressure had fallen over Canada and the Gulf States, and at 11 p. m. the highest was over New Jersey, but at 11 p. m. of the 19th was off the North Carolina coast.

No. VIII.—On the 20th the pressure rose from Manitoba to Texas, and on the 21st, at 11 p. m., high areas existed in both these sections. Both continued developing during the 22d, but on the 23d the pressure fell in the Southwest, and the other area moved southeastward from Minnesota to Maryland, after which it moved more slowly, and was, at 11 p. m. of the 24th, off the North Carolina coast.

No. IX.—Pressure rose on the 25th over the Gulf of St. Lawrence and New England. It remained high over these regions preceding the advance of low area No. X.

No. X.—Pressure rose on the 27th in Manitoba and the Northwest, extending eastward on the 28th and 29th, and at 11 p. m. of the 29th was central over Upper Canada and the Middle States, but at 11 p. m. of the 30th, over the St. Lawrence Valley, and on the 31st, at 11 p. m., was central over the mouth of that river.

Areas of Low Barometer in General.—Twelve areas of low pressure are traced upon chart No. I. These seem to be naturally divisible into three groups, viz: Nos. I, III, V, VI, and X originated in or northwest of Dakota, moved southeast to the Lake region, thence northeast to the Gulf of St. Lawrence. Nos. VII, VIII, XI, XII originated in or northwest of Indian Territory, moved southeast to Arkansas, and thence east and northeast to Maine and Nova Scotia. Nos. II and IV originated in southern Texas or northern Mexico, and moved northeast to North Carolina and Nova Scotia. So far as our maps show, the first two of these groups originated on the east slope of the Rocky Mountains, as subsidiary areas, induced by the presence of extensive depressions, either west of the mountains or over the Gulf of Mexico, precisely as the subsidiary areas of Nos. XI and XII were formed on the southeast slope of the Alleghanies.

No. I.—The barometer rose in Oregon on the 2nd, while this depression was developing to the west of Manitoba; it moved southeastward over the Lake region on the 3rd, thence eastward on the 4th, and was dissipated during that evening under the influence of the more important depression No. II.

No. II.—An area of calms or northerly winds and cold, clear weather prevailed over southern Texas on the morning of the 1st. But by the morning of the 2nd, although higher pressure and cooler clear weather prevailed in the interior of Texas, yet on the southern coast warmer cloudy weather and falling barometer were reported. During the day the winds at Indianola and Galveston shifted to southeast, with warmer cloudy weather, although everywhere else north winds continued, and at 11 p. m. of the 2nd the convergence of the winds towards a point west of Indianola, allows us to place an incipient storm-centre as on chart No. I. During the night the area of snow extended northward over eastern Texas and Indian Territory. The storm-centre moved northeastward over Louisiana to Alabama at 11 p. m., and then very rapidly to and along the Middle Atlantic coast, reaching Boston by 11 p. m. of the 4th and disappearing on the 5th beyond the northern part of the Gulf of St. Lawrence. At Indianola on the 7th the steamers arriving from Havana reported heavy weather during the last twelve days in the Gulf; 7th, 3:20 a. m., Bark Mc Dowell wrecked during strong gale, 7 miles South of San Louis pass, near Galveston. 10th, Sch'r Torrey wrecked 65 miles off mouth of Brazos river; reports having encountered terrible weather, during voyage of 13 days from Tuxpan, Mexico. Among the numerous disasters to shipping in connection with this storm we note the following: wrecks on shore, at Nashawan Island, steamer "A. Strong"; at Beaufort, S. C., ship Marcia Greenleaf; at Cape Cod, Schooner Harriet Fuller, parted cable and went ashore; near Cape Lookout, Schooner Price.

No. III.—This depression developed during the evening of the 3rd, in eastern Dakota and western Minnesota, where warm southeast winds with cloud and snow quickly succeeded the clear, cool northerly winds of the early morning. In the southeastward movement to Lake Erie, this depression gradually filled up, and after moving more slowly eastward over New York, disappeared on the 6th, in the advance southward, of an area of high barometer.

No. IV.—During the 4th and 5th an area of northerly winds and high pressure moving southward over the Gulf of Mexico, seems to have given rise to cloudy and rainy weather over the southern half of the Gulf, which was apparently followed by falling barometer on the 6th, in the West and Southwest, and a special depression is located south of the Rio Grande. During the next three days, this depression moved slowly eastward, and on the 9th, at 11 p. m. was off the coast of Georgia, at this time the pressure was quite high over the Middle and East Atlantic States, and the slight depression subsequently developed into a severe storm, which was on the 10th, 7:35 a. m. central a little southwest of Cape Hatteras. During the 10th, the storm-centre moved along and close to the Middle Atlantic coast, and was, at 11 p. m. near Cape Cod, and at 7:35 a. m. of the 11th, near Portland, Maine; after deflecting northwest into Maine, it again turned

eastward, and at 7:35 a. m. of the 12th, was east of Halifax. While delayed over New England this storm was characterized as one of the severest ever known on the coast, along the whole extent of which innumerable wrecks occurred, notwithstanding that every precaution had been taken. The hitherto unheard of wind-velocity of 186 miles per hour was measured on Mount Washington, and the following record of that station is believed to be unique—the possible error of the Robinson anemometer and the local peculiarities of its exposure on this occasion have not yet been investigated—but there is no doubt the velocities were actually recorded by the instruments and measured as follows: 10th, 9 p. m., east, 96 miles, heavy sleet; 11:22 p. m., east, 112 miles, heavy sleet, (window stove in and storm-shutters put up); 11:40 p. m., east, 144 miles, light snow; 12 m., (midnight) east, 144 miles, heavy snow. 11th, 1 a. m., east, 150 miles, heavy snow, (the roar of the wind is deafening and the building rocks and trembles); 2 a. m., east, 159 miles, heavy snow, (another window stove in); 3 a. m., east, 168 miles, heavy snow; 4 a. m., northeast, 186 miles, heavy snow; 5 a. m., northeast, 171 miles, heavy snow; 6 a. m., northeast, 132 miles, heavy snow. At Camden, Me., during the night of the 10th–11th, the wind blew with destructive hurricane force.

No. V.—This was the southern extremity of a depression, visible only in the north of Dakota, on the 7th, and disappearing north of Lake Superior on the 8th; it was apparently the eastern extension of the very low pressure prevailing in Dakota.

No. VI.—The barometer having fallen on the Oregon coast, where it was quite low on the morning of the 8th, was followed by southerly winds and falling barometer at our stations on the east slope of the Rocky Mountains, which culminated in a well defined centre of low pressure in Northern Dakota on the morning of the 9th. After moving southeastward to Lake Erie, this depression was dissipated during the 10th; its last position being in western New York, at 11 p. m. of the 10th, at which time the severe storm No. IV was central at Cape Cod.

No. VII.—This depression began on the 11th in the Southwest, where cool, northerly winds were blowing towards an extensive area of falling barometer in Texas and the Gulf of Mexico. After moving southeastward into Arkansas, the centre turned northeastward to Indiana, where it was, at 4:35 p. m. of the 13th. Here the area of low pressure expanded irregularly owing to the formation of a subsidiary depression in the Middle Atlantic States and the Lower Lake region; both of which appear to have united in New Brunswick on the 14th.

Nos. VIII. and IX.—A large and well-defined area of low pressure had, during the 17th and 18th existed between the Upper Mississippi valley and the Rocky Mountains, and appears to have induced the rise in pressure on both the Pacific and Atlantic coasts, while the depression itself extended southward until on the morning of the 19th it can be approximately located in eastern Texas. It passed thence northeastward to the St. Lawrence valley, but covered so large an area, and was attended with such slight gradients and winds, that it would not be recorded here, were it not that after existing for two days over New England and Canada, it was finally followed by such an influx of air from north and west, as to give rise to a deep depression and severe storm. The central low pressure thereafter moved on the 23d eastward over Maine and Nova Scotia, while northwest gales prevailed along the Middle Atlantic and New England coasts. (The severe gale of the 23d was marked by disasters on the coasts as follows: Sandy Hook, N.W. gale, schooner "Eva Holmes" ashore; off Absecom, schooner "Freeman" damaged; Fort Point Cove, N. H., schooner "Pilgrim" destroyed.)

No. X.—This depression is first apparent north of Montana on the 22nd, whence it evidently moved southeastward until it was in southern Minnesota at 7:35 a. m. of the 24th. There is a strong probability that it originated on the east slope of the Rocky Mountains in British America after the arrival there of the high pressure induced by the low barometer that had prevailed over Oregon and British Columbia from 11 p. m. of the 21st to 11 p. m. of the 22nd. The path of this depression was southeastward to the northern portion of Illinois, then eastward over Lake Ontario and northeast over Cape Breton, which it passed on the 26th.

No. XI.—Southerly winds and falling barometer, increasing cloudiness and higher temperature prevailed on the 25th over the Southwest. This was followed by the formation of low No. XI, central on the 26th, 7:35 a. m., in southeast Kansas, whence it moved south-southeast and east over Missouri into the Ohio valley, and at 11 p. m. of the 27th was central in central Pennsylvania. At this time the tendency to the formation of a new centre in the Middle Atlantic States was very strong, as shown by the winds, and it is very possible that the centre located for 7:35 a. m. of the 28th represents this new depression, and that the old one had disappeared. The depression moved rapidly northeast during the 28th over and beyond Cape Breton. In its passage eastward on the 25th across the State of Missouri, this storm was accompanied by thunder and lightning, and sometimes heavy hail, as reported by Prof. Nipher of the Missouri Weather Service, at ten of his stations:

No. XII.—The pressure having been high during the 27th over the Southwest, with cool northerly winds, it fell on the 28th along the entire east slope of the Rocky Mountains, and on the afternoon the incipient central low pressure was in western Texas and Kansas. By 4:35 p. m., of the 29th, this had

moved southeastward into eastern Texas while an extensive area of high barometer prevailed over the Lake region. This depression moved slowly eastward, and at 4:35 p. m. of the 30th, a subsidiary centre was apparent in southern Georgia, while the main depression was over Tennessee. This subsidiary centre rapidly grew in importance, as is usual, on the east slope of both the Appalachian and the Rocky Mountain chains. At 7:35 a. m. of the 31st, it was in eastern North Carolina, while the original centre seemed to still remain in Tennessee. During the rest of the 31st the original centre disappeared, and the new one on the coast of North Carolina was attended by increasing winds, which, among other disasters, wrecked the steamer *Metropolis*. The northeast gale of the 31st caused very high tides on the Middle Atlantic coast, from some points of which the following reports have been received: Coney Island and Rockaway, Long Island, tide 20 feet high, wooden buildings swept away. Greenport, Long Island, violent gale and very high tide, much damage to shipping. At Plumb Island, Long Island Sound, the schooner "Ella Haynes" was wrecked. Long Branch, N. J., many houses damaged and portions of the N. J. Central R. R., washed away. Near Boston, Mass.; the average snow-fall was 18 inches, with drifts of 10 feet deep. The monthly journal just received from Cape Lookout while this Review was about going to press shows that during the 31st the barometer remained vibrating between 29.45 and 29.49 during the whole day, from 7 a. m. to 4 p. m., while the hurricane moderated in severity from its extreme velocity of 120 miles per hour at 2:20 a. m.; and veered from ESE. to S. and SW., with a tremendous sea.

The following order, issued to the Signal offices in principal cities, explains itself:

WASHINGTON, D. C., February 5, 1878.—SERGEANT: By direction of the Chief Signal Officer, the Signal Service station at the wreck of the *Metropolis* will be called in at noon to-morrow, (Wednesday, February 6, 1878), the men on duty rejoining their proper stations at Kittyhawk and Cape Henry. This station was established as follows: A mounted messenger from near the wreck of the *Metropolis*, leaving there about noon, reached Kittyhawk signal station, distant about twenty miles, at 6:55 p. m., January 31. The Corporal in charge, mounting his assistant, Private William Davis, on the messenger's horse, ordered him, fully equipped, to the wreck, at the same time reporting wreck and facts to this office. The facts were at once communicated to the Life-saving Service and Naval authorities, the wrecking companies, Seaman's Aid Association and others at Norfolk and to the higher authorities at Washington. Active measures and assistance were taken at both cities. Private Davis leaving Kittyhawk within fifteen minutes after the arrival of the messenger, for going on horseback twenty miles to one of the worst sea beaches of the coast, in a dark night, through a storm, reached the wreck at 3:20 a. m., forwarded a report to the office at 4 a. m., and, at 5 a. m., sent a condensed report of the facts. By noon a more complete statement, giving also names of saved known up to that hour, had been received and furnished to the press, with many other telegrams. From the time at which Private Davis reached the wreck he remained steadily at his station on the open beach, without shelter, until 9 o'clock p. m. of Friday, at duty of twenty-six hours without rest, and in which twenty miles had been ridden on horseback. On Friday night assistance, with extra instruments, etc., which had been ordered from Cape Henry, reached the wreck-station. Cape Henry station being in turn reinforced from Norfolk, all of these stations, as well as Kittyhawk, were open all night the night of the wreck, the ensuing day, and until all the survivors had left the wreck on Friday night. It was by the agency of these stations that all telegraphic information, which appeared in the journals throughout the country, reached the press, and that by which the action of the authorities was guided. The station has since been maintained to aid the friends of the lost and others interested. The highest wind velocity of the *Metropolis* storm was, at Cape Henry, sixty miles; at Kittyhawk, thirty-nine miles; and, at Cape Hatteras, fifty miles per hour. The Cautionary Signal had been displayed at Cape May thirteen hours in advance, and at Norfolk nineteen and a half hours in advance before the wind attained a velocity of twenty-five miles per hour.

(Signed)

C. E. KILBOURNE,

First Lieutenant Second Artillery, Acting Signal Officer and Assistant.

The Chief Signal Officer thereupon issued the following commendatory order:

The Chief Signal Officer commends the prompt and zealous action, during the "Metropolis storm," of the non-commissioned officers in charge, and their assistants, at the stations Kittyhawk, Norfolk, Cape Henry and Cape Hatteras, of Privates T. B. Harrison and F. E. Seegelken, sent respectively to reinforce Cape Henry and the Metropolis wreck station, and especially of Corporal A. T. Sherwood, who notified this office the instant the report was received by messenger from the wreck at 6:50 p. m., January 31, and Private William Davis, Signal Service, U. S. A., who, under immediate direction of Corporal Sherwood, starting on horseback, fully equipped, within fifteen minutes after the receipt of the notice of the wreck at Kittyhawk station, rode through the night and storm twenty miles to the scene, by 3:20 a. m., opened Station on the Signal Service sea coast telegraph line, and reported for service at the wreck, sending a condensed report at 4 a. m., and there remained continuously on duty on the open beach, keeping constant telegraphic communication along the line and with this office, acting thus with faithful accuracy and intelligence for an uninterrupted tour of duty of twenty-six hours. By this action of the soldiers and stations named, all telegraphic information from the wreck which reached the superior authorities or appeared in the press, and on which steps for relief were taken, was secured.

For prompt and soldierly action, fidelity and good service, Private William Davis is promoted to be Corporal, Signal Service, U. S. A., to date from January 31, 1878.

INTERNATIONAL METEOROLOGY.

Storms at Sea.—SEPT. 27th, 1877, Old Providence Island, Caribbean Sea, very destructive hurricane. Nov. 24th, U. S. Naval Hospital, Yokohama, reports gale at that place; barometer, 29.39; rain-fall, 1.63 in. 30th, lat. 19° N., long. 130° E., heavy NE. gale. DEC. 3rd, lat. 24° 41' N., long. 66° 42' W., heavy WSW. gale, lasting 20 hours. 6th, lat. 36° N., 61° W., Brig Florence May reports "very heavy sea, sweeping everything." 10th, lat. 36° N., long. 71° 35' W., hurricane, lasting several hours. 17th, off Oahu, Sandwich Islands, heavy N. gales. 18th, lat. 30° S., long. 32° W., severe squalls from NNW. and SE., in which the Brig Flora lost sails, &c.; Honolulu, Sandwich Islands, severe and destructive storm of 3 days duration. 20th, terrific gale off the coast of Portugal. 22nd and 23rd, off northern coast of Hayti, heavy